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CNC Milling Technology

COURSE OUTLINE

Catalog Number	88-3147-0000
Category	CNC
Duration	15 Hours
Software Supplied	CNCMotion Control and Simulation Software Intelitek software and documentation are available at http://intelitekdownloads.com.

Note: Items in *italics* are optional and require a physical milling center with milling equipment.

Activity 1 – Part 1: Introduction and Safety

What is CNC?

What is a Mill?

The Components of Your Milling Center

Activity 1 – Part 2: Introduction and Safety

Safety Considerations and Guidelines

Maintaining Tools

Machine Operation Safety Guidelines

Activity 2: CNCMotion Control Software

CNCMotion Control Software

Task: Running CNCMotion

CNCMotion Window Components

Task: Changing Jog Control Settings

CNCMotion Working Modes

Program Window

Task: Saving a Program

Task: Unlocking a Program

3D Image Window

Controlling the Hardware

Task: Adjusting the View of the Mill

Activity 2 Hardware Tasks

Activity 3: Mounting the Workpiece

Steps Required to Machine a Part

Fixtures

Vise Components and Construction

Task: Setting Up the Vise

Coordinate Systems

Manipulating the Cross-Slide

Task: Moving the Cross-Slide

Activity 3 Hardware Tasks

Activity 4: Tooling

Steps Required to Machine a Part

CNC Milling Operations

CNC Milling Tools

Selecting a Milling Tool

What is the Spindle?

Task: Mounting a Tool in the Tool Holder

Task: Mounting a Tool in the Spindle

Quiz

Tool Definition in CNCMotion

Task: Defining Tools in the Control Program

Task: Selecting a Tool for Use

Tool Movement

Task: Moving the Tool

Activity 4 Hardware Tasks

Activity 5: Reference Positions

Steps Required to Machine a Part

Introduction to Reference Positions

Machine Coordinates

Task: Homing the Mill

Workpiece Coordinates

Quiz

Task: Preparing the Virtual Mill

Task: Touching Off the Top of the Stock (Z=0)

Activity 8: Fundamentals of NC Programming

Developing Numerical Control Programs

Computer Aided Design and Manufacturing

Developing an NC Program

Sketching the Part to Scale

Task: Sketching the Part to Scale on Graph Paper

Programming Modes

Task: Determining Absolute Coordinate Values

Quiz

Tool Paths

Quiz

NC Programming Overview

Address Characters

Machine Commands: X, Y and Z

G-Codes: Programming Mode Subgroup

Task: Writing the Program

Task: Verifying the Tool Path

Activity 9: Programming the House

Linear Interpolation

G-Codes: Interpolation Subgroup

Task: Adding Interpolation Commands to the Program

M-Codes: Miscellaneous Operations

Machine Commands: Tool Parameters Subgroup

Task: Completing the Program

Suggestions for Block Structure

Task: Fine-Tuning the Program

Task: Verifying the Program Code

Activity 10: Tool Offset Theory

Steps Required to Machine a Part

Program Readability

Task: Adding Comments to the Program

Tool Offsets

Task: Modifying the Program

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Task: Defining Tool Offsets

Task: Preparing the Machining Center

Task: Machining a Part

Activity 10 Hardware Tasks

Activity 11: Arc Programming

Programming Circular Movements

Task: Defining the Tool Path

Task: Writing the Program

Task: Preparing the Mill

Task: Performing a Dry Run

Task: Machining the Part

Activity 11 Hardware Tasks

Activity 12: The Star

Task Description

Task: Determining the Tool Path

Task: Writing the Program

Task: Preparing the Hardware

Task: Verifying the Program

Task: Preparing to Perform a Dry Run

Task: Performing a Dry Run

Task: Machining the Part

Activity 12 Hardware Tasks

Activity 13: Programming Your Initials

Task Description

Task: Determining the Tool Path

Task: Preparing the Hardware

Task: Writing the Program

Task: Verifying the Program

Task: Performing a Dry Run

Task: Machining the Part

Activity 13 Hardware Tasks

Activity 14: Final Project

Final Project Specifications

Post Test